REMARKS

Claims 1-13, all the claims pending in the application, stand rejected.

Claim Rejections - 35 U.S.C. § 102

Claims 1-13 are rejected under 35 U.S.C. § 102(e) as being anticipated by Smith et al (6,543,146). These rejections are traversed for at least the following reasons.

In response to the Remarks filed on June 6, 2005, the Examiner noted that the Applicants' arguments for patentability were focused on the extraction of azimuth error angle due to rotation by the converter. Applicants distinguished Smith because it compensates for errors due to magnetic filed perturbation. In reply, the Examiner acknowledges that Smith does compensate for errors due to magnetic field perturbation, but notes that Smith also extracts an azimuth error angle due to rotation by the converter. The Examiner points to the tilt sensor 514 in Smith and states that it is used "in order to calculate the converter L."[1] The Examiner refers to the teachings at col. 2, lines 21-35, col. 3, lines 50-60, col. 4, lines 9-29, col. 8, line 17-67, col. 9, lines 4-24 and col. 6, lines 2-17 for support.

Applicant first notes that the matrix L_E does not operate on the basis of the x-axis tilt angle nor the y-axis tilt angle, and that the matrix L_E is not equivalent to the converter that rotates the x-axis and the y-axis based on the tilt angles. Furthermore, Smith not only does not disclose the converter, but also does not disclose the primary azimuth calculator nor the azimuth error angle extracting unit.

Next, the cited portions of the teachings in Smith do not support the Examiner's position. For example, col. 2, lines 21-35 concern an embodiment in which a magnetic field vector H_{MEAS} representing magnetic filed strength in three axes is obtained and used to calculate a matrix compensation coefficient L_E and a vector compensation coefficient H_{PE} using a system of equations. This teaching is relevant to obtaining accurate earth's magnetic field data. However,

[1] Applicants' attorney notes that during a telephone call on January 23, 2006, Applicant requested clarification as to what the Examiner meant by the "converter L." The Examiner indicated that she ma

there is no teaching that is relevant to the use of a tilt angle detector, and no teaching of a converter that uses the tilt angle to generate rotated-axes, as claimed.

Also, the teachings at col. 3, lines 56-60 simply concern the use of the compensation process for perturbing magnetic effects, which obtains parameters for each of a plurality of combinations of orientations and azimuths, for other non-magnetic sensor errors. Again, this is not relevant to the claimed invention.

Next, the disclosure at col. 4, lines 9-29 concerns a method of calibrating compass magnetic and gravity measurements at various well distributed combinations of pitch, roll and azimuth orientations, followed by the construction of an equation for each orientation that expresses the estimated earth's magnetic field as a function of the measured field, a matrix coefficient and a vector coefficient which are to be determined. Finally, a subset of linear equations is solved to obtain a preliminary estimate of values of the matrix and vector coefficients, and the entire system of equations is solved to refine the preliminary estimate preferably on an iterative basis. Again, this does not concern tilt angle or the use of a converter based upon a tilt angle.

In addition, the teachings at col. 8, line 67 - col. 9, line 24 concern an implementation in Fig. 5 of a multiplexer 508 that receives acceleration information from accelerometers 514, which measure acceleration and gravity along each of the three axes of the internal coordinate system of the electronic compass. A teaching is made of the correction of the measured magnetic fields by calibrating the electronic compass 300, performing magnetic compensation once the compass has been calibrated, and calculating the magnetic azimuth after performing the magnetic compensation. The azimuth angle is calculated and output. The patent explains that the formula is valid for any orientation in three axis space once L_E and H_{PE} are determined. It is further noted that compensation depends only on H_{MEAS} and does not require any external information. Smith et al states that with appropriate values for the 12 elements in the matrix, the compensation formula can compensate for all types of errors arising from the perturbing magnetic fields. This teaching expressly concerns the generation of azimuth angle. However, this angle is not calculated on the basis of a rotated axis, as obtained by a converter. Further,

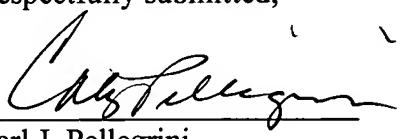
there is no teaching relevant to the extraction of azimuth error. The Examiner refers to element 524 for this limitation, but that reference is only general with respect to software for implementing a calibration of the compass and is not specifically related to extraction of azimuth error.

Finally, at col. 16, lines 2-18, Smith teaches that the system of 32 equations taught in the patent can be solved with values of L_E and H_{PE}, H_{GRAV} and H_{NORTH} using computer implemented numeric methods. Finally, it states that rotations are calculated about G_{MEAS} in a manner similar to that describe for calculating the rotation of estimated H_{EARTH} into the north/east/down referenced frame. Again, this general comment does not teach the claimed invention.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Carl J. Pellegrini
Registration No. 40,766

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

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